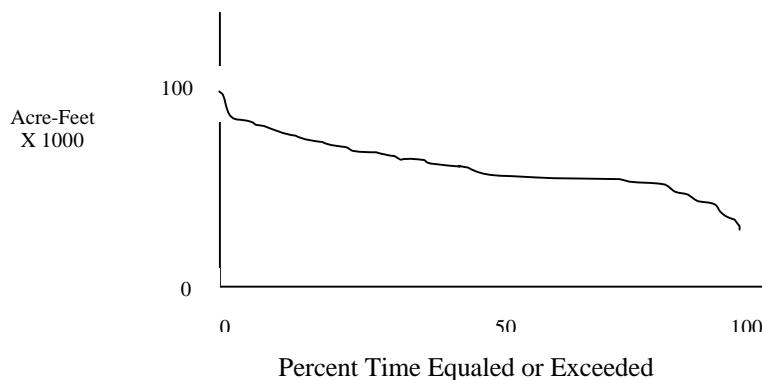


Appendix D. Guidance for Project Delivery Teams for Identifying the Amount of Water to be Reserved for the Natural System in the Project Implementation Report Process

A. Technical Process for Quantifying CERP Project Benefits

WRDA 2000 requires that the amount of water to be reserved for the natural system be identified in the PIR. This implies that a volume needs to be determined. Such volumes (water quantity) can be determined from water budget information using a hydrologic simulation model such as the South Florida Water Management Model. However, an average annual volume alone would not provide for the variability of water flows. Therefore, a probabilistic approach is proposed. Specifically, the water budget annual means for the simulation period can be turned into an annual volume probability curve at specific locations (cells or indicator regions) as shown below:



These curves should be generated at all appropriate points of interest in the system. For the Restudy, system-wide water budgets (using average annual values) were developed for a variety of conditions (Natural System Model, 1995 base case, 2050 base case, and the recommended plan) by summing the inputs and outputs throughout the system. This water budget was used to determine the total amount of water generated by the comprehensive plan as well as how much went to the natural system and how much to other uses. The set of volume probability curves generated for each PIR similarly can be used to determine how much water is being generated and which use sector is benefiting.

The volume probability curves should first be developed for the pre-CERP baseline condition (i.e. the conditions existing on December 11, 2000, the date of enactment of WRDA 2000). This is the baseline from which CERP will be measured against. Initially, this baseline will be established by assuming the historical rainfall conditions of 1965 through 2000. As additional rainfall data become available, the baseline condition will need to include these additional data.

For each PIR, volume probability curves should be developed by assuming that the project recommended in that PIR as well as all previously authorized projects (i.e. PIRs that have been approved) have been constructed and are operational. For evaluation purposes, this condition assumes that the project recommended in each PIR would be the next added increment to CERP

Each PIR represents a cumulative identification of both the water to be reserved for the natural system and the water to be made available for other uses. In effect, what this procedure does is to establish a system-wide “bank account” of the amount of water that needs to be reserved for the natural system. Although the PIR (which is produced for individual projects) provides the vehicle for the identification of water, the master accounting should be done on a system-wide basis. Therefore, projects are not incremental, but the system-wide quantification of new water developed in the current PIR will replace the quantification of new water from the previous PIR’s.

The total amount of water made available by the projects should be computed by comparing the quantities estimated from the volume probability curves generated by the projects to the pre-CERP base line volume probability curves. This can be done at each location and summed for the total system. The computation can likewise be done for the water that is going to the natural system as a result of a project in order to identify the water that should be reserved for the natural system for that project. A third computation should identify that portion of the total quantity of water that is made available for other uses and may be allocated after the project is constructed and operational.

It is recommended that the following information be modeled and incorporated into the PIR for each facility to provide assurances that the project is designed and operated consistent with the goals of CERP and consistent with the LEC Regional Water Supply Plan as follows:

1. An agreed upon set of performance measures related to flood protection, water supply and environmental restoration goals, documenting the expected performance of the new facility compared to the without condition (base case) and consistent with the performance targets agreed to in the CERP.
2. A total volume duration curve for the specific project which is reflective of the full range of rainfall conditions under which its performance was analyzed.
3. A volume duration curve for the specific project of water delivered to the environment.
4. A volume duration curve for the specific project of water delivered to other uses.
5. Volume duration curves for the regional system including the current project and all previously approved PIRs identifying the total water, natural system and other uses of water to date.
6. The estimated one in ten year drought volume made available to the natural system.
7. The estimated one in ten year drought volume (surface and groundwater) made available to other uses.
8. An explicit set of operational rules for the facility.

B. Project Implementation Report Formulation and Evaluation

Formulation and evaluation for each project of the Comprehensive Everglades Restoration Plan (CERP) will be conducted in a uniform manner according to the “Plan Formulation and Evaluation Procedure” that will result in the development of a Project Implementation Report. The process, for identifying the amount of water to be reserved for the natural system, will be used following the formulation and identification of a selected project in the PIR process. The

results of this analysis will also be a part of the PIR. The water to be reserved will be determined on a system-wide basis unless there is a specific environmental element within the boundary or in the vicinity of a project, in which case a project-level reservation will also be made.

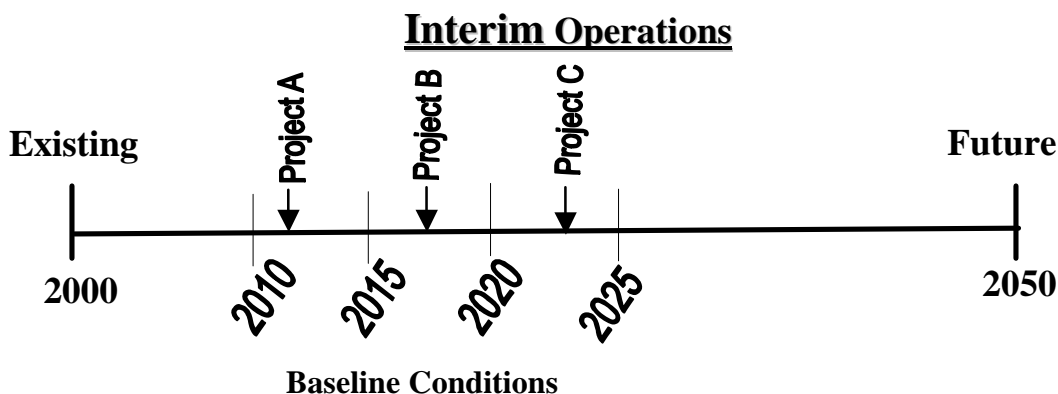
As described in the CERP Formulation and Evaluation Procedures, individual projects will be formulated and the Selected Project will be identified in the context of the total CERP. Formulation in most cases will be conducted on a system-wide basis. The future with project will be a combination of projects that have been previously approved or authorized, projects that are a part of the Comprehensive Plan that are yet to be refined in the PIR process, and the project that the PIR is refining. This system-wide approach will be used to quantify the system-wide benefits of the project as required in the Corps planning process and to assure that the overall goals of the project continue to be met.

C. Process for Identifying the Amount of Water to be Reserved

The CERP Formulation and Evaluation Procedures describe a three step process for the development of individual projects in the project implementation report process. After the selected project as been identified on the basis of optimizing system-wide benefits when applicable, an interim operations assessment will be conducted. The interim operations assessment step of the formulation and evaluation process will be used to identify the amount of water to be reserved. In this step of the formulation and evaluation process the Selected Project will be analyzed in the context of the next added increment. To complete the analysis of the next added increment, the selected project along with other projects previously authorized will be compared against two separate model runs, the first will be the pre-CERP 2000 baseline and the second will be other projects that have been previously authorized.

During next added increment analysis, the interim operations of the C&SF project, previously authorized projects, plus the selected project will be optimized. The draft operating manual that will be part of the PIR will be based on the design and operational assumptions derived from the next added increment analysis.

The basis for determining the minimal acceptable performance for the next added increment will be the system-wide performance as predicted in the five-year incremental simulations from modeling the Master Implementation Sequencing Plan.



1 The analyses for the identification of the amount of water to be reserved will be conducted on a
2 project-level basis and on a system-wide basis.

3
4 Project-level quantification for reservations will be developed in cases where there is a quantity
5 of water that should be reserved within the boundaries or in the vicinity of where the project will
6 be implemented. In these situations, sub-regional models will be used to identify the amount of
7 water to be reserved. Examples of projects where project-level quantification may occur include
8 Indian River Lagoon Natural Storage and Treatment Areas, WCA 3A/3B Seepage Management,
9 Southern Golden Gate Estates, and Storm-water Treatment Areas for various projects.

10
11 System-wide quantification for reservations will be developed in cases where the affects of a
12 project can be detected outside of the vicinity of a project. Most CERP projects are expected to
13 have some system-wide affects. In these situations system-wide modeling tools, such as the
14 South Florida Water Management Model will be used to identify the amount of water to be
15 reserved.

16
17 **D. Modeling to Identify the Amount of Water to be Reserved Based on the**
18 **Next Added Increment**

- 19
20 1. Data sets to be simulated for both system-wide and project level reservations:
21 A. Pre-CERP 2000 Baseline
22 B. All authorized projects with operations optimized without the Selected Project.
23 C. Selected Project plus all other authorized projects with operations optimized. (It is
24 anticipated that this is the modeling information that would provide the basis for the
25 identification of the amount of water to be reserved.)
26
27 2. Modeling Products:
28 A. Project -Level- Derive volume probability curves for the project site and vicinity for runs
29 A and B and C Compare with the appropriate Performance Measures and Targets.
30 Compute Volume-Probability curves for:
31 1. dry season (Nov-May)
32 2. wet season (June-October)
33 3. Water Year (November-October)
34 B. System-wide- Derive volume probability curves for each receiving environmental region
35 for both runs A and B and C. Compare with appropriate Performance Measures and
36 Targets.
37 Compute Volume-Probability curves for:
38 1. dry season (Nov-May)
39 2. wet season (June-October)
40 3. Water Year (November-October)

41
42 Environmental Regions: St. Lucie Estuary, Caloosahatchee Estuary, Lake Okeechobee,
43 WCA-1 (Loxahatchee National Wildlife Refuge), WCA-2A/2B, WCA-3A/3B, Everglades
44 National Park, Florida Bay, Loxahatchee Slough, Lake Worth Lagoon, Biscayne Bay, and
45 Big Cypress